Description of the universal chess interface (UCI)

Contents

Note

This is not the original spec file. I took it, and transformed it into something that I think is more readable.

The contents are the same with 2 exceptions:

- Engine to GUI > option > name is missing the defaults.
- The example at the end is a diagram instead of plaintext.

Spec

- The specification is independent of the operating system. For Windows, the engine is a normal exe file, either a console or "real" windows application.
- all communication is done via standard input and output with text commands,
- The engine should boot and wait for input from the GUI, the engine should wait for the "isready" or "setoption" command to set up its internal parameters as the boot process should be as quick as possible.
- the engine must always be able to process input from stdin, even while thinking.
- all command strings the engine receives will end with 'n', also all commands the GUI receives should end with 'n', Note: 'n' can be 0x0d or 0x0a0d or any combination depending on your OS. If you use Engine and GUI in the same OS this should be no problem if you communicate in text mode, but be aware of this when for example running a Linux engine in a Windows GUI.
- arbitrary white space between tokens is allowed Example: "debug onn" and " debug on n" and "t debug t ttont n" all set the debug mode of the engine on.
- The engine will always be in forced mode which means it should never start calculating or pondering without receiving a "go" command first.
- Before the engine is asked to search on a position, there will always be a position command to tell the engine about the current position.
- by default all the opening book handling is done by the GUI, but there is an option for the engine to use its own book ("OwnBook" option, see below)
- if the engine or the GUI receives an unknown command or token it should just ignore it and try to parse the rest of the string in this line. Examples: "joho debug onn" should switch the debug mode on given that joho is not defined, "debug joho onn" will be undefined however.
- if the engine receives a command which is not supposed to come, for example "stop" when the engine is not calculating, it should also just ignore it.

Move format:

The move format is in long algebraic notation.

A nullmove from the Engine to the GUI should be sent as 0000. Examples: e2e4, e7e5, e1g1 (white short castling), e7e8q (for promotion)

GUI to engine:

These are all the command the engine gets from the interface.

uci

Tell engine to use the uci (universal chess interface), this will be sent once as a first command after program boot to tell the engine to switch to uci mode.

After receiving the uci command the engine must identify itself with the "id" command and send the "option" commands to tell the GUI which engine settings the engine supports if any. After that the engine should send "uciok" to acknowledge the uci mode. If no uciok is sent within a certain time period, the engine task will be killed by the GUI.

debug

Parameters: `[ on | off ]`.

Switch the debug mode of the engine on and off.

In debug mode the engine should send additional infos to the GUI, e.g. with the "info string" command, to help debugging, e.g. the commands that the engine has received etc.

This mode should be switched off by default and this command can be sent any time, also when the engine is thinking.

isready

This is used to synchronize the engine with the GUI. When the GUI has sent a command or multiple commands that can take some time to complete, this command can be used to wait for the engine to be ready again or to ping the engine to find out if it is still alive.

E.g. this should be sent after setting the path to the tablebases as this can take some time.

This command is also required once before the engine is asked to do any search to wait for the engine to finish initializing.

This command must always be answered with "readyok" and can be sent also when the engine is calculating in which case the engine should also immediately answer with "readyok" without stopping the search.

setoption

Parameters: `name <id> [value <x>]`

This is sent to the engine when the user wants to change the internal parameters of the engine.

- For the "button" type no value is needed.
- One string will be sent for each parameter and this will only be sent when the engine is waiting.

- The name and value of the option in <id> should not be case sensitive and can inlude spaces.
- The substrings "value" and "name" should be avoided in <id> and <x> to allow unambiguous parsing, for example do not use <name> = "draw value".

Here are some strings for the example below:

```
"setoption name Nullmove value true\n"
"setoption name Selectivity value 3\n"
"setoption name Style value Risky\n"
"setoption name Clear Hash\n"
"setoption name NalimovPath value c:\chess\tb\4;c:\chess\tb\5\n"
```

register

This is the command to try to register an engine or to tell the engine that registration will be done later. This command should always be sent if the engine has sent "registration error" at program startup.

The following tokens are allowed:

- `later`: the user doesn't want to register the engine now.
- `name <x>`: the engine should be registered with the name `<x>`
- `code <y>`: the engine should be registered with the code `<y>`

Example:

```
"register later"
"register name Stefan MK code 4359874324"
```

ucinewgame

This is sent to the engine when the next search (started with "position" and "go") will be from a different game.

This can be a new game the engine should play or a new game it should analyse but also the next position from a testsuite with positions only.

If the GUI hasn't sent a "ucinewgame" before the first "position" command, the engine shouldn't expect any further ucinewgame commands as the GUI is probably not supporting the ucinewgame command. So the engine should not rely on this command even though all new GUIs should support it.

As the engine's reaction to "ucinewgame" can take some time the GUI should always send "isready" after "ucinewgame" to wait for the engine to finish its operation.

position

Parameters: `[fen <fenstring> | startpos ]  moves <move1> .... <movei>`

Set up the position described in fenstring on the internal board and play the moves on the internal chess board.

If the game was played from the start position the string "startpos" will be sent Note: no "new" command is needed. However, if this position is from a different game than the last position sent to the engine, the GUI should have sent a "ucinewgame" inbetween.

go

Start calculating on the current position set up with the "position" command.

There are a number of commands that can follow this command, all will be sent in the same string. If one command is not sent its value should be interpreted as it would not influence the search.

searchmoves

Parameters: `<move1> .... <movei>`

Restrict search to this moves only

Example: After "position startpos" and "go infinite searchmoves e2e4 d2d4" the engine should only search the two moves e2e4 and d2d4 in the initial position.

ponder

Start searching in pondering mode.

Do not exit the search in ponder mode, even if it's mate!

This means that the last move sent in in the position string is the ponder move. The engine can do what it wants to do, but after a "ponderhit" command it should execute the suggested move to ponder on.

This means that the ponder move sent by the GUI can be interpreted as a recommendation about which move to ponder. However, if the engine decides to ponder on a different move, it should not display any mainlines as they are likely to be misinterpreted by the GUI because the GUI expects the engine to ponder on the suggested move.

wtime

Parameters: `<x>`

White has x msec left on the clock

btime

Parameters: <x>

Black has x msec left on the clock

winc

Parameters: <x>

White increment per move in mseconds if $x > 0$

binc

Parameters: <x>

Black increment per move in mseconds if $x > 0$

movestogo

Parameters: <x>

There are x moves to the next time control, this will only be sent if $x > 0$.

If you don't get this and get the wtime and btime it's sudden death

depth

Parameters: <x>

Search x plies only.

nodes

Parameters: <x> Search x nodes only,

mate

Parameters: <x>

Search for a mate in x moves

movetime

Parameters: <x>

Search exactly x mseconds

infinite

Search until the "stop" command. Do not exit the search without being told so in this mode!

stop

Stop calculating as soon as possible, don't forget the "bestmove" and possibly the "ponder" token when finishing the search

ponderhit

The user has played the expected move.

This will be sent if the engine was told to ponder on the same move the user has played. The engine should continue searching but switch from pondering to normal search.

quit

Quit the program as soon as possible

Engine to GUI:

id

Identify the engine.

name

Parameters: <x>

This must be sent after receiving the "uci" command to identify the engine, e.g. "id name Shredder X.Yn"

author

Parameters: <x>

This must be sent after receiving the "uci" command to identify the engine, e.g. "id author Stefan MKn"

uciok

Must be sent after the id and optional options to tell the GUI that the engine has sent all infos and is ready in uci mode.

readyok

This must be sent when the engine has received an "isready" command and has processed all input and is ready to accept new commands now.

It is usually sent after a command that can take some time to be able to wait for the engine, but it can be used anytime, even when the engine is searching, and must always be answered with "isready".

bestmove

Parameters: `<move1> [ ponder <move2> ]`

The engine has stopped searching and found the move `<move>` best in this position.

The engine can send the move it likes to ponder on. The engine must not start pondering automatically. This command must always be sent if the engine stops searching, also in pondering mode if there is a "stop" command, so for every "go" command a "bestmove" command is needed!

Directly before that the engine should send a final "info" command with the final search information, the the GUI has the complete statistics about the last search.

copyprotection

This is needed for copyprotected engines. After the uciok command the engine can tell the GUI, that it will check the copy protection now.

This is done by "copyprotection checking". If the check is ok the engine should send "copyprotection ok", otherwise "copyprotection error". If there is an error the engine should not function properly but should not quit alone. If the engine reports "copyprotection error" the GUI should not use this engine and display an error message instead!

The code in the engine can look like this:

```
TellGUI("copyprotection checking\n");

// ... check the copy protection here ...

if(ok) {
   TellGUI("copyprotection ok\n");
} else {
   TellGUI("copyprotection error\n");
}
```

registration

This is needed for engines that need a username and/or a code to function with all features.

Analog to the "copyprotection" command the engine can send "registration checking" after the uciok command followed by either "registration ok" or "registration error".

Also after every attempt to register the engine it should answer with "registration checking" and then either "registration ok" or "registration error".

In contrast to the "copyprotection" command, the GUI can use the engine after the engine has reported an error, but should inform the user that the engine is not properly registered and might not use all its features.

In addition the GUI should offer to open a dialog to enable registration of the engine. To try to register an engine the GUI can send the "register" command.

The GUI has to always answer with the "register" command if the engine sends "registration error" at engine startup (this can also be done with "register later") and tell the user somehow that the engine is not registered. This way the engine knows that the GUI can deal with the registration procedure and the user will be informed that the engine is not properly registered.

info

The engine wants to send information to the GUI.

This should be done whenever one of the info has changed. The engine can send only selected infos or multiple infos with one info command, e.g. "info currmove e2e4 currmovenumber 1" or "info depth 12 nodes 123456 nps 100000".

Also all infos belonging to the pv should be sent together e.g. "info depth 2 score cp 214 time 1242 nodes 2124 nps 34928 pv e2e4 e7e5 g1f3"

I suggest to start sending "currmove", "currmovenumber", "currline" and "refutation" only after one second to avoid too much traffic.

Additional info:

depth

Parameters: <x>

Search depth in plies

seldepth

Parameters: <x>

Selective search depth in plies, if the engine sends seldepth there must also be a "depth" present in the same string.

time

Parameters: <x>

The time searched in ms, this should be sent together with the pv.

nodes

Parameters: `<x>`

X nodes searched, the engine should send this info regularly

pv

Parameters: `<move1> ... <movei>`

The best line found

multipv

Parameters: `<num>`

This is for the multi pv mode.

For the best move/pv add "multipv 1" in the string when you send the pv. in k-best mode always send all k variants in k strings together.

score

One of:

- cp `<x>`: the score from the engine's point of view in centipawns.
- mate `<y>`: mate in y moves, not plies. If the engine is getting mated use negative values for y.
- lowerbound: the score is just a lower bound.
- upperbound: the score is just an upper bound.

currmove

Parameters: `<move>`

Currently searching this move

currmovenumber

Parameters: `<x>`

Currently searching move number x, for the first move x should be 1 not 0.

hashfull

Parameters: `<x>`

The hash is x permill full, the engine should send this info regularly

nps

Parameters: `<x>`

X nodes per second searched, the engine should send this info regularly

tbhits

Parameters: `<x>`

X positions where found in the endgame table bases

sbhits

Parameters: `<x>`

X positions where found in the shredder endgame databases

cpuload

Parameters: `<x>`

The cpu usage of the engine is x permill.

string

Parameters: `<str>`

Any string str which will be displayed be the engine, if there is a string command the rest of the line will be interpreted as `<str>`.

refutation

Parameters: `<move1> <move2> ... <movei>`

Move `<move1>` is refuted by the line `<move2> ... <movei>`, i can be any number >= 1.

Example: after move d1h5 is searched, the engine can send

```
"info refutation d1h5 g6h5"
```

If g6h5 is the best answer after d1h5 or if g6h5 refutes the move d1h5.

If there is no refutation for d1h5 found, the engine should just send "info refutation d1h5". The engine should only send this if the option "UCI_ShowRefutations" is set to true.

currline

Parameters: `<cpunr> <move1> ... <movei>`

This is the current line the engine is calculating. `<cpunr>` is the number of the cpu if the engine is running on more than one cpu.

`<cpunr> = 1,2,3....`

If the engine is just using one cpu, `<cpunr>` can be omitted.

If `<cpunr>` is greater than 1, always send all k lines in k strings together. The engine should only send this if the option "UCI_ShowCurrLine" is set to true.

option

This command tells the GUI which parameters can be changed in the engine.

This should be sent once at engine startup after the "uci" and the "id" commands if any parameter can be changed in the engine.

The GUI should parse this and build a dialog for the user to change the settings. Note that not every option needs to appear in this dialog as some options like "Ponder", "UCI_AnalyseMode", etc. are better handled elsewhere or are set automatically.

If the user wants to change some settings, the GUI will send a "setoption" command to the engine.

Note that the GUI need not send the setoption command when starting the engine for every option if it doesn't want to change the default value.

For all allowed combinations see the examples below, as some combinations of this tokens don't make sense.

One string will be sent for each parameter.

name

Parameters: `<id>`

The option has the name id.

Certain options have a fixed value for `<id>`, which means that the semantics of this option is fixed.

Look for the original spec for details

type

Parameters: <t>

The option has type t.

There are 5 different types of options the engine can send:

check A checkbox that can either be true or false

spin A spin wheel that can be an integer in a certain range

combo A combo box that can have different predefined strings as a value

button A button that can be pressed to send a command to the engine

string A text field that has a string as a value, an empty string has the value "<empty>"

default

Parameters: `<x>`

The default value of this parameter is x

min

Parameters: `<x>`

The minimum value of this parameter is x

max

Parameters: `<x>`

The maximum value of this parameter is x

var

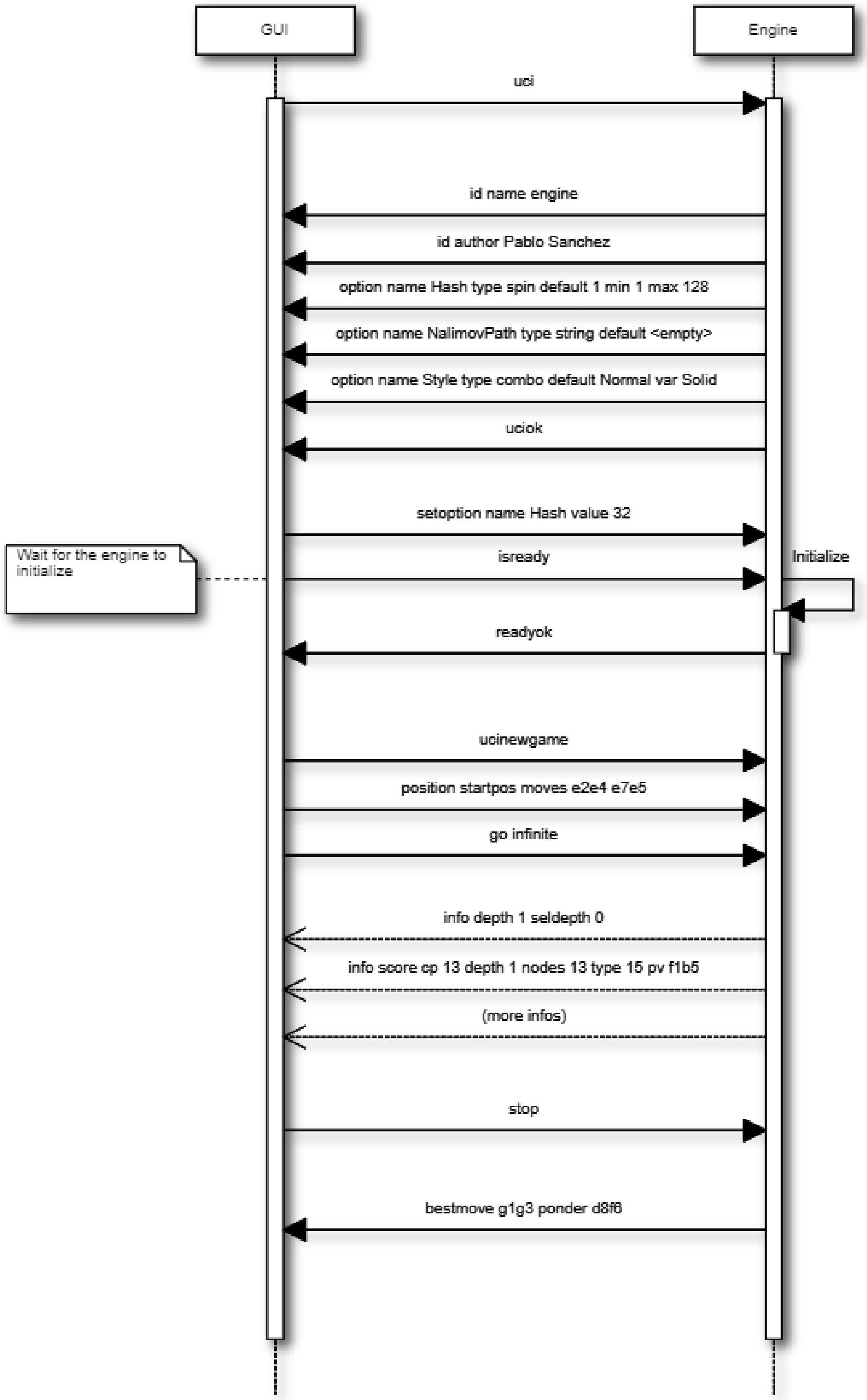
Parameters: `<x>`

A predefined value of this parameter is x

Examples: are 5 strings for each of the 5 possible types of options

```
"option name Nullmove type check default true\n"
"option name Selectivity type spin default 2 min 0 max 4\n"
"option name Style type combo default Normal var Solid\n"
"option name NalimovPath type string default c:\\n"
"option name Clear Hash type button\n"
```

Examples:


GUI
Engine
uci
id name engine
id author Pablo Sanchez
option name Hash type spin default 1 min 1 max 128
option name NalimovPath type string default <empty>
option name Style type combo default Normal var Solid
uciok
setoption name Hash value 32
isready
Initialize
Wait for the engine to initialize
readyok
ucinewgame
position startpos moves e2e4 e7e5
go infinite
info depth 1 seldepth 0
info score cp 13 depth 1 nodes 13 type 15 pv f1b5
(more infos)
stop
bestmove g1g3 ponder d8f6